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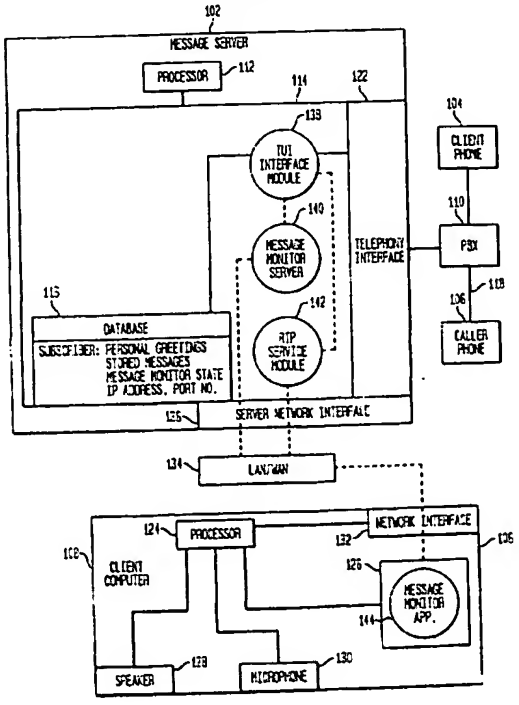
(54) Message monitor application concept and implementation

(57) A voice messaging system allowing the monitoring of telephone calls is provided. The system permits subscribers to monitor incoming calls handled by voice messaging systems, and to selectively listen to the message as it is recorded, ignore the message, or establish two-way audio communications with the caller. The system further provides these monitoring capabilities to the subscriber at any location having access to a computer network that is interconnected to the message server, for example the Internet. The present invention is particularly well-suited for use with telephones that are part of private branch exchanges, telephones subscribing to central voice messaging systems, and telephones whose lines are used for the transmission of computer data in addition to voice communications.

FIG. 1



EP 1 120 954 A2

Description

FIELD OF THE INVENTION

[0001] The present invention relates to automated telecommunications voice messaging systems.

BACKGROUND OF THE INVENTION

[0002] In recent years, telemarketing has become increasingly common. Because the target of such calls often does not wish to be subjected to an unsolicited sales pitch, it is desirable to monitor or screen telephone calls in realtime before answering them. The simple telephone answering machine allows messages from callers to be listened to as the messages are dropped into the answering machine's recording device. If the user so chooses, he or she can barge into the call and speak directly with the caller. If the user does not wish to speak with the caller, the recording of the message can be allowed to proceed normally.

[0003] As an alternative to the answering machine, server-based voice message systems for answering calls when a user is not available are offered by various service providers. For example, a residential user may subscribe to a voice messaging service offered by that user's local telephone company. In a business setting, the user's telephone may be part of a private branch exchange or other system interconnected to a voice messaging system. Although such voice mail systems provide users with a wide variety of desirable functions, they do not provide a call screening function. The call screening function could be provided by the addition of certain hard-wired connections to conventional voice messaging systems, but such a solution would be expensive to implement and relatively inflexible in operation. Accordingly, the screening of calls answered by voice messaging systems is generally impossible from telephones that subscribe to a voice mail service.

[0004] Conventional answering machine and voice messaging systems also offer a user no way to monitor telephone calls placed to his or her telephone number when the user is away from the telephone or when the telephone line is otherwise in use. Therefore, although certain existing voice mail systems allow users remote access to a log of calls placed to their telephone number and any associated message, there is no provision for realtime monitoring of telephone calls from a remote location. Furthermore, where the user's telephone line is being used to provide the user with a connection to a network such as the Internet, conventional systems do not provide realtime monitoring of telephone calls placed to the user's line.

SUMMARY OF THE INVENTION

[0005] The present invention is directed to solving these and other problems and disadvantages of the prior art. Generally, according to the present invention, a messaging system is interfaced with a client computer such that when a message is deposited in a mailbox belonging to a subscriber of the messaging system, a copy of that message is automatically sent to the client computer for screening. According to the present invention, the deposited message is transmitted to the client computer using a packet-based communication protocol. Additionally, the present invention provides the subscriber with the ability to barge into a call as a message is being deposited, and to speak with the caller directly in realtime.

[0006] In particular, the present invention provides a software subsystem employing Voice-over Internet Protocol (VoIP) audio transmission and generic TCP/IP remote procedure calls to provide a client application that can communicate with the centralized messaging server of a voice mail system using a TCP/IP-based network. A client application in the form of a graphical user interface (GUI) running on the client computer enables the user or subscriber to log in to the messaging server by providing information such as the telephone number to be monitored and a password for authentication. At the time the subscriber logs in, the IP address and connecting port number (*i.e.* TCP/IP socket) of the client computer is registered with the centralized messaging server to allow communications between the client computer and the messaging server.

[0007] According to the present invention, an incoming call that has been transferred to the messaging server is checked against the server's database of telephone lines or extensions to monitor. The messaging server of the present invention can be used in connection with a private branch exchange (PBX) that is part of a private enterprise, or as part of the public switched telephony network (PSTN). For purposes of simplification, the present application will describe the invention in the context of a private branch exchange having associated telephone extensions, although the invention is equally applicable to telephone lines associated with the public switched telephony network. If the incoming call has been made to an extension that the server has been instructed to monitor, notification of the incoming call is made to the subscriber at the registered IP address over the TCP/IP-based network. The GUI associated with the client computer allows the subscriber to ignore the call, monitor the call, or barge in. When the call is ignored, the incoming message is stored normally on the messaging server. If the subscriber chooses to monitor the call, a recording of the message is stored normally on the messaging server and the message is provided in realtime to the subscriber at the client computer over the TCP/IP-based network. Finally, if the subscriber chooses to barge in, the messaging server issues a message to the caller that the subscriber is available, and establishes two-way communications between the subscriber and the caller, with at least a portion of the communication circuit between the messaging server and the sub-

scriber being completed over the TCP/IP-based network.

[0008] These and other advantages and features of the invention will become more apparent from the following description of an illustrative embodiment of the invention taken together with the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009]

Fig. 1 is a block diagram of a messaging system that includes an illustrative embodiment of the present invention;

Figs. 2A, 2B and **2C** are functional flow diagrams of message monitor related operations according to an embodiment of the present invention;

Fig. 3 is a screen shot of a GUI window according to an embodiment of the present invention;

Fig. 4 is a screen shot of another GUI window according to an embodiment of the present invention; and

Fig. 5 illustrates functions of and communications between components of the messaging system according to an embodiment of the present invention.

DETAILED DESCRIPTION

[0010] **Fig. 1** shows a realtime messaging system **100** that includes an illustrative message monitor arrangement configured according to the present invention. The arrangement generally comprises a message server **102**, a user or subscriber telephone **104**, a caller telephone **106**, and a client computer **108**. Also shown in **Fig. 1** is private branch exchange (PBX) **110**, to which the subscriber telephone **104** is interconnected, although a PBX **110** is not a required component of the messaging system **100**. The message server **102** may be any telephony messaging system, such as the Intuity Audix®, or AnyPath® messaging systems of Lucent Technologies Inc. The message server **102** is generally a stored program controlled apparatus, having a processor **112** for executing control programs stored in storage **114** to provide subscribers with messaging services. Storage **114** may be any computer-readable storage medium. Storage **114** also includes a database **116** for providing message mailboxes for each subscriber of the messaging service and for storing associated information.

[0011] In general, the caller telephone **106** establishes a connection to the subscriber telephone **104**, and the telephones **104** and **106** are in turn interconnected to the message server **102**. In the embodiment illustrated in **Fig. 1**, the communication link between the caller telephone **106** and the subscriber telephone **104** is made at least partially through a PBX **110**. However, the PBX **110** is not necessary to the present invention, and the connection can be made between the caller telephone **106** and the subscriber telephone **104** entirely over the public switched telephony network (PSTN) **118**, such as where the caller telephone **106** and the subscriber telephone **104** are not part of a PBX **110**. Alternatively, the connection between the subscriber telephone **104** and the caller telephone **106** could be entirely over a PBX **110**, for instance, where the telephones **104** and **106** are part of the same business establishment.

[0012] The message server **102** is, according to the illustrated embodiment, connected to the PBX **110** by a communications line **120**. The communications line **120** may be a standard analog tip-ring telephony interface, or a T1 line or other high band-width communications link. In an alternative embodiment, such as where the subscriber telephone **104** is not part of a PBX **110**, the link between the message server **102** and the subscriber telephone **104** may be made over the PSTN **118**. Similarly, the connection between the message server **102** and the caller telephone **106** may be made over the PSTN **118**. Alternatively, the connections between the telephones **104** and **106**, and between the telephones **104** and **106** and the message server **102**, may be made using Internet Protocol (IP) telephony techniques, for example Voice Over Internet Protocol telephony based upon the ITU H.323 standard. A telephony interface **122** is provided as an interface between the communications line **120** and the message server **102**. The telephony interface **122** generally comprises hardware and low level operating programs for interfacing the control programs of the message server **102** with the communications line **120**.

[0013] The client computer **108** generally includes a processor **124**, storage **126**, a speaker **128**, a microphone **130**, and a network interface **132**. The client computer **108** is interconnected to the message server **102** by a computer network **134**. The computer network **134** may be any local area network (LAN) or wide area network (WAN). For instance, the computer network **134** may be the public Internet or a private Intranet. The computer network **134** is interconnected to the message server through the server network interface **136**. In general, the client computer **108** may comprise any device capable of communicating over a computer network and having an associated speaker and microphone. Therefore, although the client computer **108** is generally a personal computer equipped with a speaker **128** and a microphone **130**, other devices may be used in its place. For instance, the client computer **108** may comprise a web browser device having an associated microphone for use in connection with a television and an Internet connection. Other suitable devices include personal information managers (PIMs) configured for connection to a network and having a speaker and a microphone.

[0014] According to the present invention, control programs stored in the storage **114** of the message server **102** include a telephony user interface (TUI) module **138**, a message monitor server **140**, and a remote trans-

mission protocol (RTP) service module **142**. Although these software modules are mentioned separately, they may be included in a single control program. The database **116** serves to store information concerning individual subscribers, such as the subscribers' telephone numbers, the subscribers' personal greetings, a mailbox containing stored messages for each subscriber, and a registry of subscriber telephone numbers to be monitored, as will be described in greater detail below.

[0015] The storage **126** associated with the client computer 108 generally includes a message monitor application program **144** for communicating messaging information between the message server **102** and the client computer **108** across the computer network **134**, and for presenting the client with a GUI for controlling functions of the realtime messaging system **100**.

[0016] The functionality of the system **100** illustrated in **Fig. 1** in providing a message monitoring capability is illustrated in **Figs. 2A, 2B** and **2C**. Referring now to **Fig. 2A**, message monitoring is initiated by the subscriber when he or she logs in at step **200**. The client log in **200** typically requires the subscriber (*i.e.*, the user) to enter their telephone number and an authentication code. Generally, the login **200** is accomplished by starting the message monitor program **144** stored in the client computer **108** and selecting the option to log in by pressing the log in button **302** in the message monitor window **304** (see Fig. 3). The monitoring of new calls in realtime can be selected by checking the appropriate box **306** in the message monitor window **304**. The message monitor program, through a remote procedure call (RPC) request, such as a traditional RPC mechanism, JAVA RMI, Active X or DCOM/COM, informs the message server that monitoring of new calls is desired. This request is identified by the IP address and socket of the client computer **108** and the message monitor program **144**. At step **202**, the message server **102** authenticates the log-in by accessing administrative records in the database **116** to verify that a valid telephone number and authentication code pair have been entered. At step **204**, the address and socket of the client computer **108** and message monitor program **142** used to log in the subscriber are registered in the message monitor server **140**, and the subscriber telephone **104** number is registered in the TUI interface module **138** for monitoring.

[0017] When a caller seeks to establish a communications link with a subscriber, for example, by placing a telephone call to a monitored subscriber telephone **104**, and the subscriber telephone **104**, for example, is busy or is not taken off-hook within a specified number of rings (step **206**), the unanswered call is redirected to the TUI interface module **138** of the message server **102** by the PBX (or PSTN). The techniques used for the redirection of the unanswered call are well known in the art. The TUI interface module **138** retrieves the personal greeting corresponding to the subscriber telephone **104** from the database **116** and plays that message to the caller telephone **106** through, in the illustrated example, the telephony interface **122**, the communications line **120**, and the PSTN **118**. At the same time, the TUI interface module **138**, at step **208**, queries the registry of monitored extensions to determine whether monitoring of the called telephone number has associated with it the command to monitor all incoming telephone calls. If monitoring is not enabled, the stored subscriber greeting is presented to the caller at step **210**, and the caller may record a message for the subscriber at step **212**, which is stored in the subscriber's mailbox in the database **116**. The TUI interface module **138** then returns to step **206** to await additional incoming calls.

[0018] If client monitoring is enabled, the subscriber's personal greeting is retrieved from the database **116** and played to the caller at step **214** normally. In addition, and at substantially the same time as performing step **214**, the TUI interface module **138** alerts the message monitor server **140** that a message requiring monitoring is being received. The message monitor server **140** retrieves the IP address information corresponding to the client computer **108**, and sends an asynchronous message to the client computer **108** over the network **134** (step **216**) using a TCP/IP remote procedure call to provide notification that a realtime telephone call is coming in to the subscriber's mailbox. According to one embodiment of the present invention, notification consists of presenting a new call notification window **308** on the visual display of the computer **108**, alerting the subscriber of the incoming call (see **Fig. 3**). In addition, caller identification (caller ID) information may be presented to the user as part of the new call notification in a provided box **310**.

[0019] In response to the notification, the subscriber may specify any of several actions. The subscriber may choose to monitor the caller (step **222**) by pressing the "monitor caller" button **312** in the notification window **308**. Pressing the "monitor caller" button **312** causes a request to monitor to be sent over the computer network **134** to the RTP service module **142**. The TUI interface **138** then sets up a remote transmission protocol audio session. Referring now to **Fig. 2B**, the incoming message is recorded normally (step **224**), and a copy of the audio message is simultaneously provided to the client at the registered IP address (step **226**) by the RTP service module **142** by duplicating the bytes of audio data comprising the incoming message. The audible message is output through the speaker **128** associated with the client computer **108** in realtime. The audio message is provided by the message monitor server **140** to the client computer **108** through the computer network **134** as a remote transmission protocol (RTP/RTCP) audio stream. Accordingly, an asynchronous protocol, such as TCP/IP, is used in combination with an audio transmission protocol, such as the International Telecommunications Union (ITU) G-711, G-723 or G-729 transmission protocols to provide a Voice Over Internet Protocol audio stream. The simultaneous recording of the incoming message **224** and playback of the message at the

registered IP address **226** continues until either the caller telephone **106** is placed on hook or a maximum message recording time has been reached (step **228**), in which case the system returns to step **206** (Fig. 2A) to await further incoming telephone calls.

[0020] While monitoring the message being recorded, the subscriber may choose to ignore the call by pressing the "ignore call" button **314** (step **230**) in the notification window **308**, in which case the message monitor server 140 ceases to provide the audio message to the client computer **108** (step **232**, **Fig. 2B**), the RTP service module **142** tears down the RTP audio stream connection, and the incoming message continues to be recorded normally (step **220**, **Fig. 2A**).

[0021] With reference again to **Fig. 2A**, as yet another option, the subscriber may choose to barge in at step **234** by hitting the "barge-in" button **316** in the notification window **308** in response to an incoming telephone call. Where the subscriber chooses to barge in **234**, the caller is notified that the subscriber is available to take the call at step **236** (**Fig. 2C**). Recording of the message is discontinued (step **238**, **Fig. 2C**), and a two-way RTP audio communications session is then established between the RTP service module **142** of the message server 102 and the client computer **108**, over the network **134** (step 240, **Fig. 2C**). At this same time, the TUI interface module **138** stops recording the message from the caller in the database **116**, and discards any portion of the message that has already been recorded. The subscriber and the caller may then conduct a normal conversation, with the subscriber using the speaker **128** and microphone **130** of the client computer **108** for the output and input of audible signals respectively, and with at least the portion of the transmission circuit between the message server **102** and the client computer **108** comprising the network **134**. Therefore, at least a portion of the telephone conversation is transmitted asynchronously over the network **134**, with the message server **102** providing an IP telephony gateway functionality. Upon selection of the "barge in" function, the GUI running on the client's computer **108** displays a call in progress window **402** (see **Fig. 4**). The call-in-progress window **402** presents the subscriber with a "hang up" button **404** to allow the subscriber to terminate the call. At step **242** (**Fig. 2C**), upon the detection of on-hook at the caller end, or the pressing of the "hang up" button **404** by the subscriber, the two-way audio session is discontinued. The system then returns to step **206** (**Fig. 2A**) to await the next incoming telephone call.

[0022] The subscriber may also choose to barge into a call that is being monitored (step **244**, **Fig. 2B**) by selecting the "barge in" button **316**. The system then proceeds as described above where the subscriber has selected the "barge in" button **316** (step **234**, **Fig. 2A**) upon notification of the incoming call (step **216**). However, in this instance the RTP audio session will have already been enabled, thus all that is required to provide two-way communications is to enable the microphone **130** associated with the client computer **108**.

[0023] The subscriber may also take no action, in which case the incoming message is recorded normally (step **220**) until the caller telephone **106** sends an on-hook signal or a maximum message record time is reached. The subscriber may also choose to begin monitoring the call (step **222**), to barge in to the call (step **234**), or to ignore the call (step **218**) and cause the notification window **308** to be hidden, by pressing the appropriate button **312**, **314** or **316** while the incoming message is being recorded.

[0024] Various of the functions performed by the message server **102** and the client computer **108**, according to one embodiment of the present invention, are illustrated in **Fig. 5**. In particular, **Fig. 5** illustrates generally some of the communications that can take place between the message server **102** and the client computer **108**.

[0025] To discontinue monitoring of telephone calls to the subscriber telephone **104**, the subscriber can terminate the message monitor application program **144** by pressing the exit button **318** or by closing the program **144** using the close button **320**. When the user terminates the message monitor application program **144**, the monitoring of the subscriber's extension is unregistered from the TUI interface module **138**.

[0026] Of course, various modifications to the system **100** described above can be contemplated. For instance, certain of the various user operations may be selected by default, such as where the subscriber desires to monitor every incoming telephone call, by adding provisions for default settings to the described embodiment. According to one embodiment of the system **100**, when multiple calls are received at the subscriber telephone **104**, the message monitor application program **144** may present the user with multiple notification windows 308. The subscriber may choose to listen to the messages, ignore, or to barge in by activating the appropriate button **312**, **314**, or **316** in the notification window **308**. According to a further embodiment, the system **100** may allow the subscriber to select all internal or external calls for monitoring where the subscriber telephone is part of a private branch exchange, or to monitor only messages originating from selected caller telephone **106** extensions or line numbers. According to yet another embodiment, the system **100** may allow a single mailbox to be monitored from multiple client computers **108**. For example, a group may monitor a single subscriber telephone **104**. When a call is received at the subscriber telephone **104**, one or more members of the group may monitor the call, and one or more members may barge in. When multiple members barge in, a conference call is established. The system **100** may also allow the monitoring of a plurality of telephones **104** from a single client computer **108**. Such variations can be made without departing from the spirit and the scope of the invention and without diminishing its attendant advantages, and it is intended that such variations be cov-

ered by the appended claims.

[0027] The foregoing discussion of the invention has been presented for purposes of illustration and description. Further, the description is not intended to limit the invention to the form disclosed herein. Consequently, variations and modifications commensurate with the above teachings, within the skill and knowledge of the relevant art, are within the scope of the present invention. The embodiments described hereinabove are further intended to explain the best mode presently known of practicing the invention and to enable others skilled in the art to utilize the invention in such or in other embodiments and with various modifications required by their particular application or use of the invention. It is intended that the appended claims be construed to include alternative embodiments to the extent permitted by the prior art.

Claims

1. A message monitoring system, comprising:

   a subscriber telephone;
   a client computer;
   a messaging server for providing a realtime messaging service, comprising:

   an interface for interconnecting said server to said subscriber telephone;
   a database for storing subscriber information and for storing audio stream data from an incoming telephone call;
   a message monitor server for providing information regarding said incoming telephone call to said client computer;
   an interface module for providing said audio stream data from said incoming telephone call to said database for storage; and
   a remote transfer protocol service module; and

   a computer network interconnecting said client computer and said remote transfer service module of said messaging server, wherein said audio stream data from said incoming telephone call is transmitted over said computer network and provided to said client computer in realtime.

2. The system of Claim 1, wherein said computer network comprises the Internet.

3. The system of Claim 1, wherein said computer network comprises an Intranet.

4. The system of Claim 1, wherein said client computer comprises a personal computer.

5. The system of Claim 1, further comprising a speaker and a microphone interconnected to said client computer.

6. The system of Claim 1, wherein said audio stream data is transmitted asynchronously.

7. The system of Claim 1, further comprising a client application associated with said client computer to provide a user interface, wherein a user may choose to ignore, to monitor or to barge-in to an incoming telephone call.

8. The system of Claim 1, wherein said audio stream data is transmitted between said messaging server and said client computer such that a caller and a user can conduct a conversation with said user in realtime.

9. The system of Claim 8, wherein said audio stream data is transmitted using a Voice over Internet Protocol.

10. A method of monitoring messages, comprising:

    providing a messaging server having a mailbox for a subscriber;
    in response to an audio stream message received at the mailbox of said subscriber from a caller, notifying said subscriber in realtime that said audio stream message is being received; and
    storing said audio stream in said mailbox while simultaneously providing said audio stream in realtime to said subscriber over a data network.

11. The method of Claim 10, wherein said notification is made to an address specified by said subscriber.

12. The method of Claim 10, further comprising allowing said subscriber to selectively engage in two-way audio communications with said caller in realtime.

13. The method of Claim 12, further comprising discarding said stored audio stream after two-way audio communications have been engaged by said subscriber.

14. The method of Claim 10, wherein said step of notifying said subscriber comprises providing said subscriber with caller identification information.

15. The method of Claim 14, wherein said caller identification information is provided visually.

16. The method of Claim 10, wherein said data network is the Internet.

17. The method of Claim 10, wherein said data network is an Intranet.

18. The method of Claim 10, wherein said audio stream is provided as a Voice over Internet Protocol audio stream.

19. The method of Claim 10, wherein said audio stream is transmitted over said data network asynchronously.

20. An apparatus for remotely monitoring telephone calls, comprising:

a messaging server having a mailbox for a subscriber;
means for notifying said subscriber when an audio stream message is being received at said mailbox of said subscriber in realtime;
means for storing said audio stream in said mailbox; and
means for providing said audio stream to said subscriber in realtime over a data network.

FIG. 1

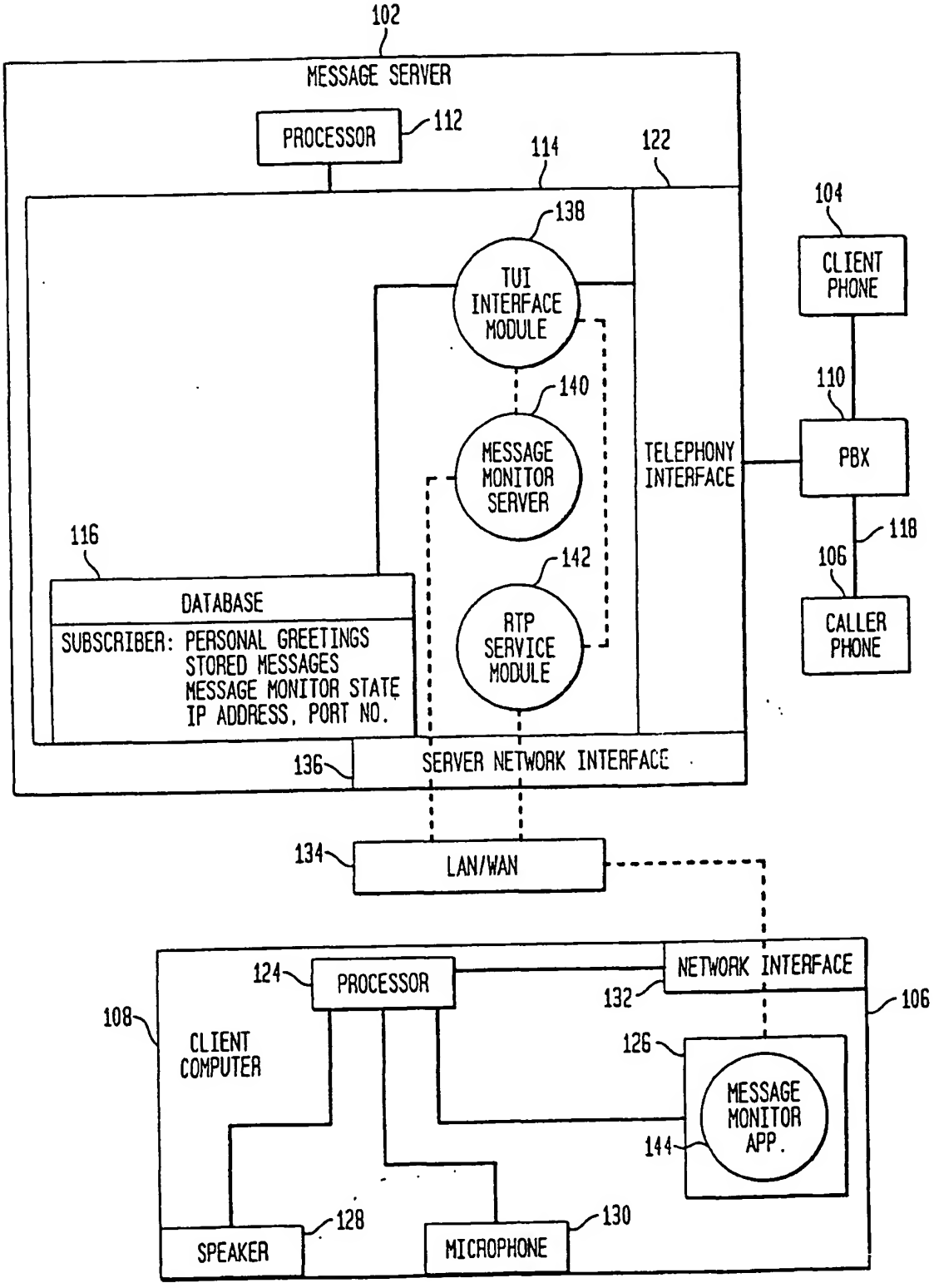

102
MESSAGE SERVER
PROCESSOR
112
114
122
138
TUI INTERFACE MODULE
140
MESSAGE MONITOR SERVER
142
RTP SERVICE MODULE
116
DATABASE
SUBSCRIBER: PERSONAL GREETINGS
STORED MESSAGES
MESSAGE MONITOR STATE
IP ADDRESS, PORT NO.
TELEPHONY INTERFACE
136
SERVER NETWORK INTERFACE
104
CLIENT PHONE
110
PBX
118
106
CALLER PHONE
134
LAN/WAN
124
PROCESSOR
NETWORK INTERFACE
132
106
108
CLIENT COMPUTER
126
MESSAGE MONITOR APP.
144
SPEAKER
128
MICROPHONE
130

FIG. 2A

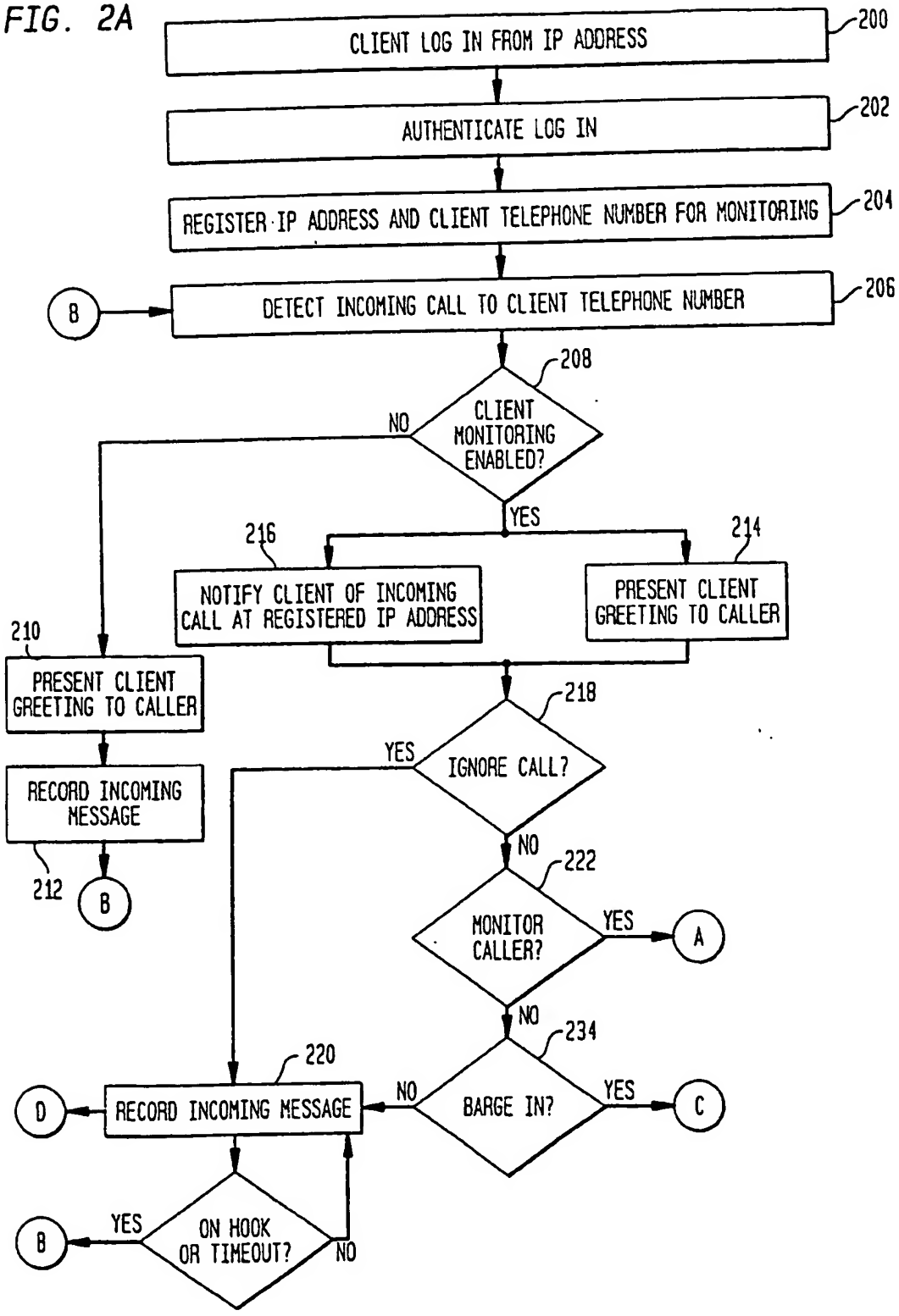

CLIENT LOG IN FROM IP ADDRESS
200
AUTHENTICATE LOG IN
202
REGISTER IP ADDRESS AND CLIENT TELEPHONE NUMBER FOR MONITORING
204
B
DETECT INCOMING CALL TO CLIENT TELEPHONE NUMBER
206
208
CLIENT MONITORING ENABLED?
NO
YES
216
NOTIFY CLIENT OF INCOMING CALL AT REGISTERED IP ADDRESS
214
PRESENT CLIENT GREETING TO CALLER
210
PRESENT CLIENT GREETING TO CALLER
218
IGNORE CALL?
YES
RECORD INCOMING MESSAGE
212
B
NO
222
MONITOR CALLER?
YES
A
NO
234
BARGE IN?
NO
YES
C
220
D
RECORD INCOMING MESSAGE
B
YES
ON HOOK OR TIMEOUT?
NO

FIG. 2B

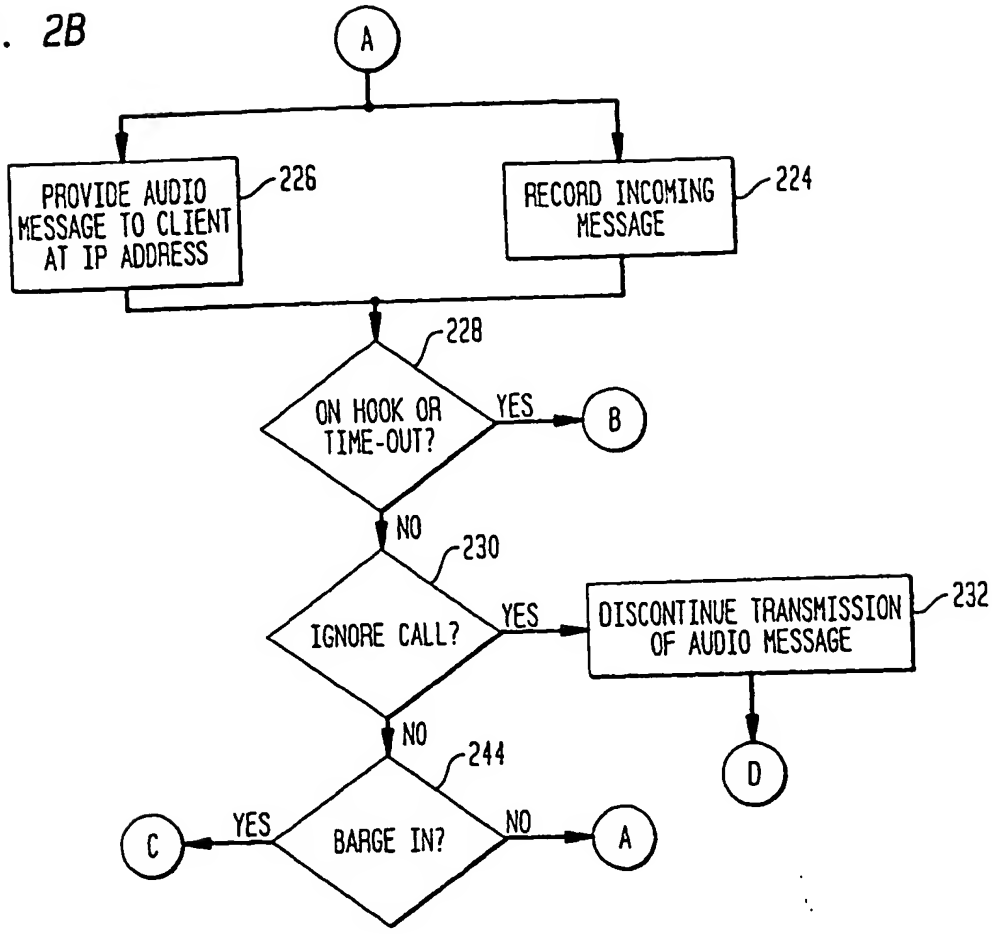

A
PROVIDE AUDIO MESSAGE TO CLIENT AT IP ADDRESS
226
RECORD INCOMING MESSAGE
224
228
ON HOOK OR TIME-OUT?
YES
B
NO
230
IGNORE CALL?
YES
DISCONTINUE TRANSMISSION OF AUDIO MESSAGE
232
D
NO
244
BARGE IN?
YES
C
NO
A

FIG. 2C

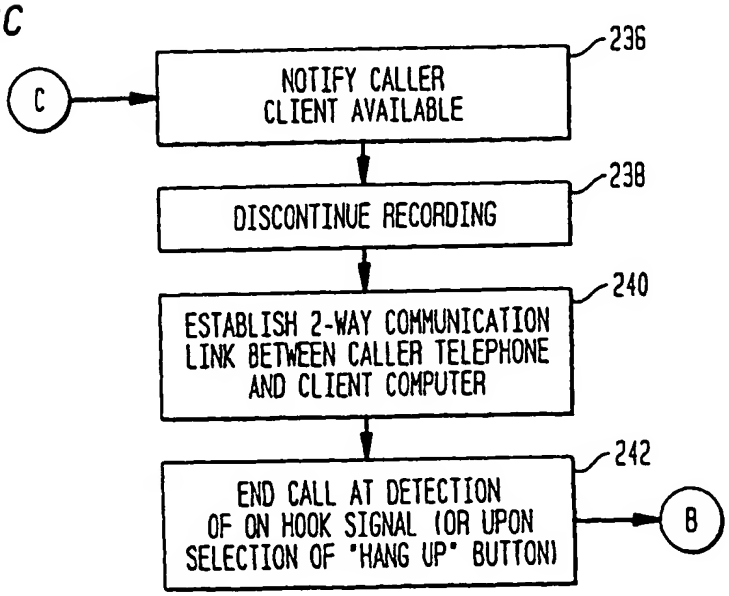

C
NOTIFY CALLER CLIENT AVAILABLE
236
DISCONTINUE RECORDING
238
ESTABLISH 2-WAY COMMUNICATION LINK BETWEEN CALLER TELEPHONE AND CLIENT COMPUTER
240
END CALL AT DETECTION OF ON HOOK SIGNAL (OR UPON SELECTION OF "HANG UP" BUTTON)
242
B

FIG. 3

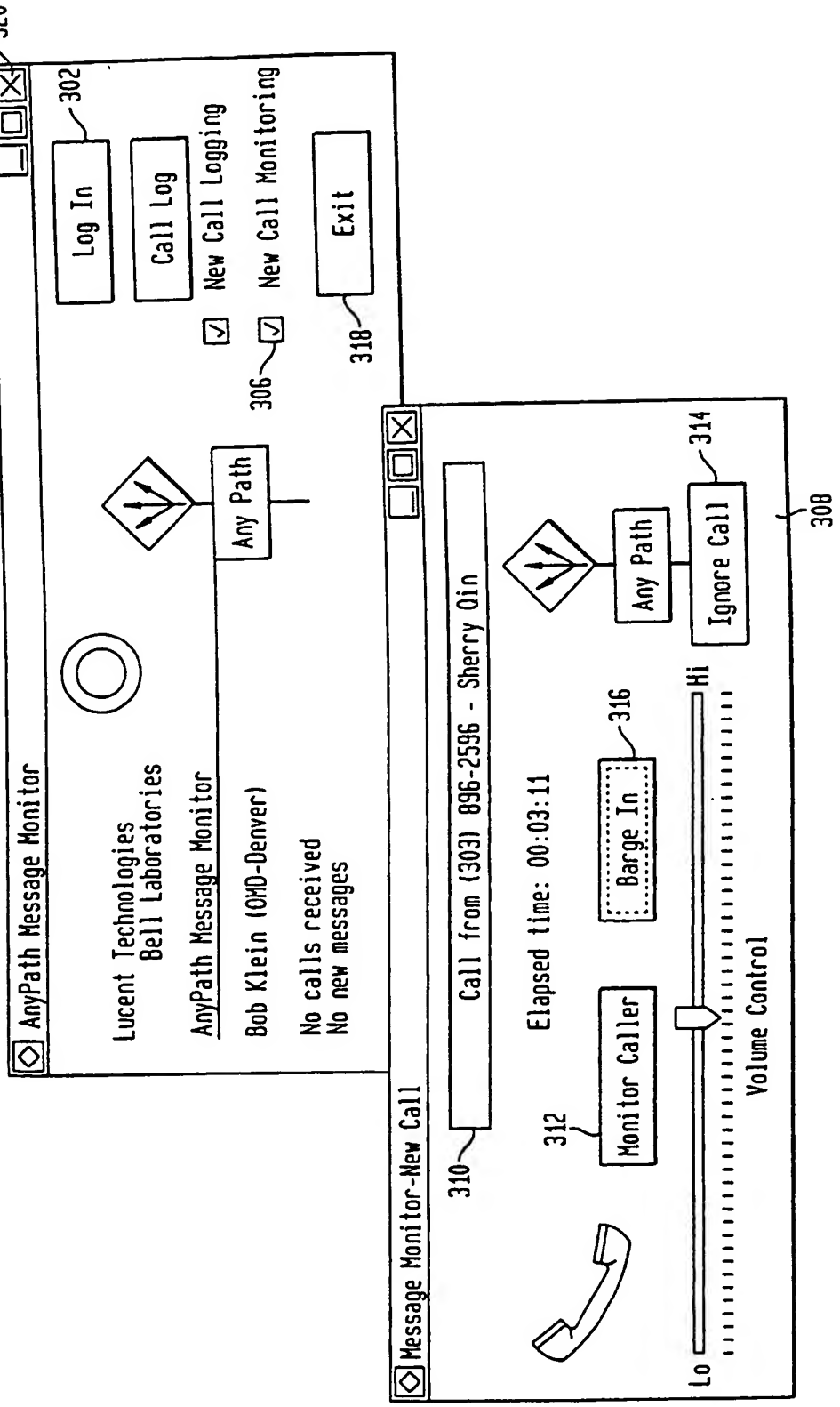

320
AnyPath Message Monitor
302
Log In
Call Log
New Call Logging
New Call Monitoring
Exit
318
306
Lucent Technologies
Bell Laboratories
AnyPath Message Monitor
Bob Klein (OMD-Denver)
No calls received
No new messages
Any Path
Message Monitor-New Call
Call from (303) 896-2596 - Sherry Qin
310
Elapsed time: 00:03:11
312
Monitor Caller
316
Barge In
Any Path
314
Ignore Call
308
Lo
Hi
Volume Control

FIG. 4

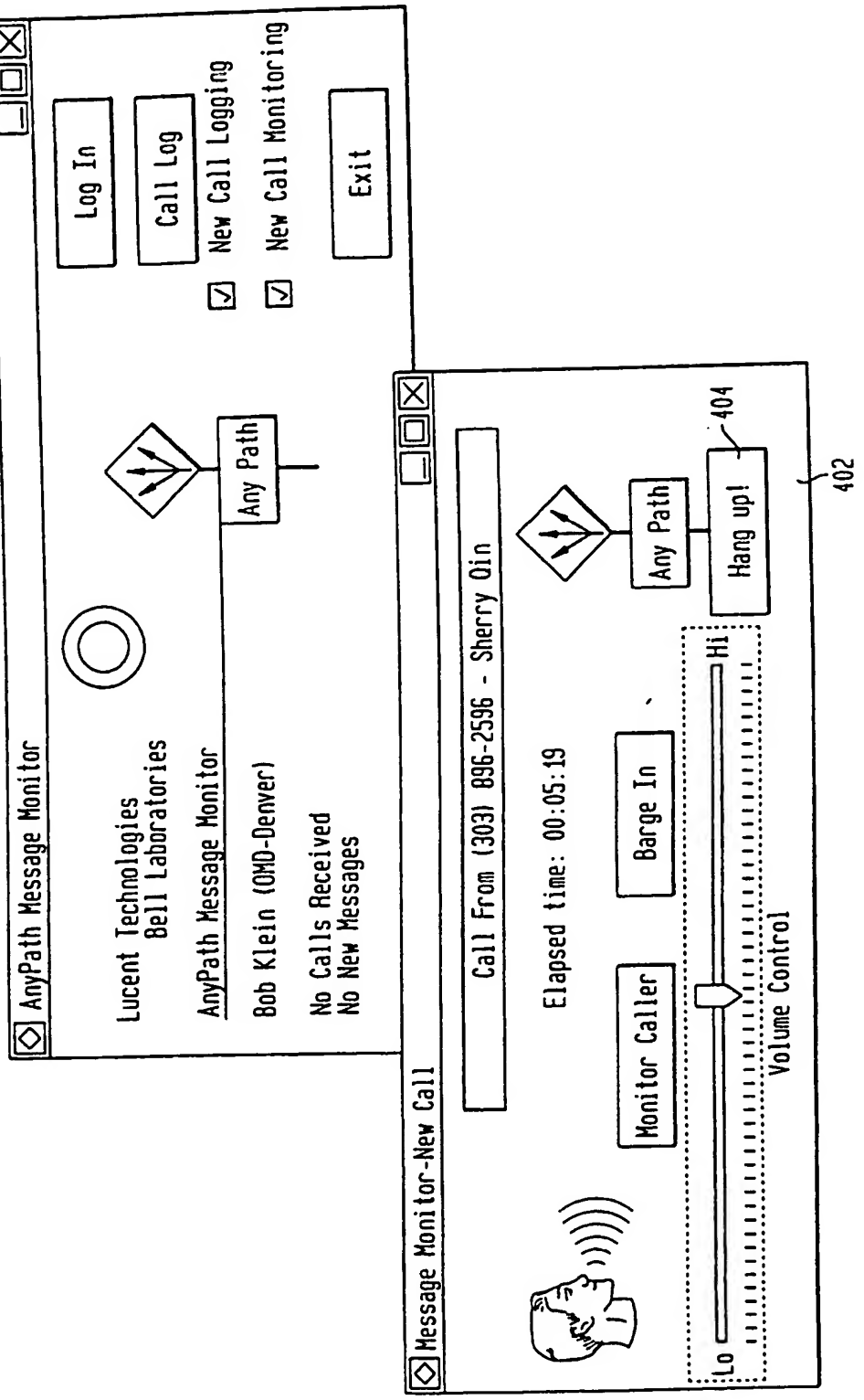
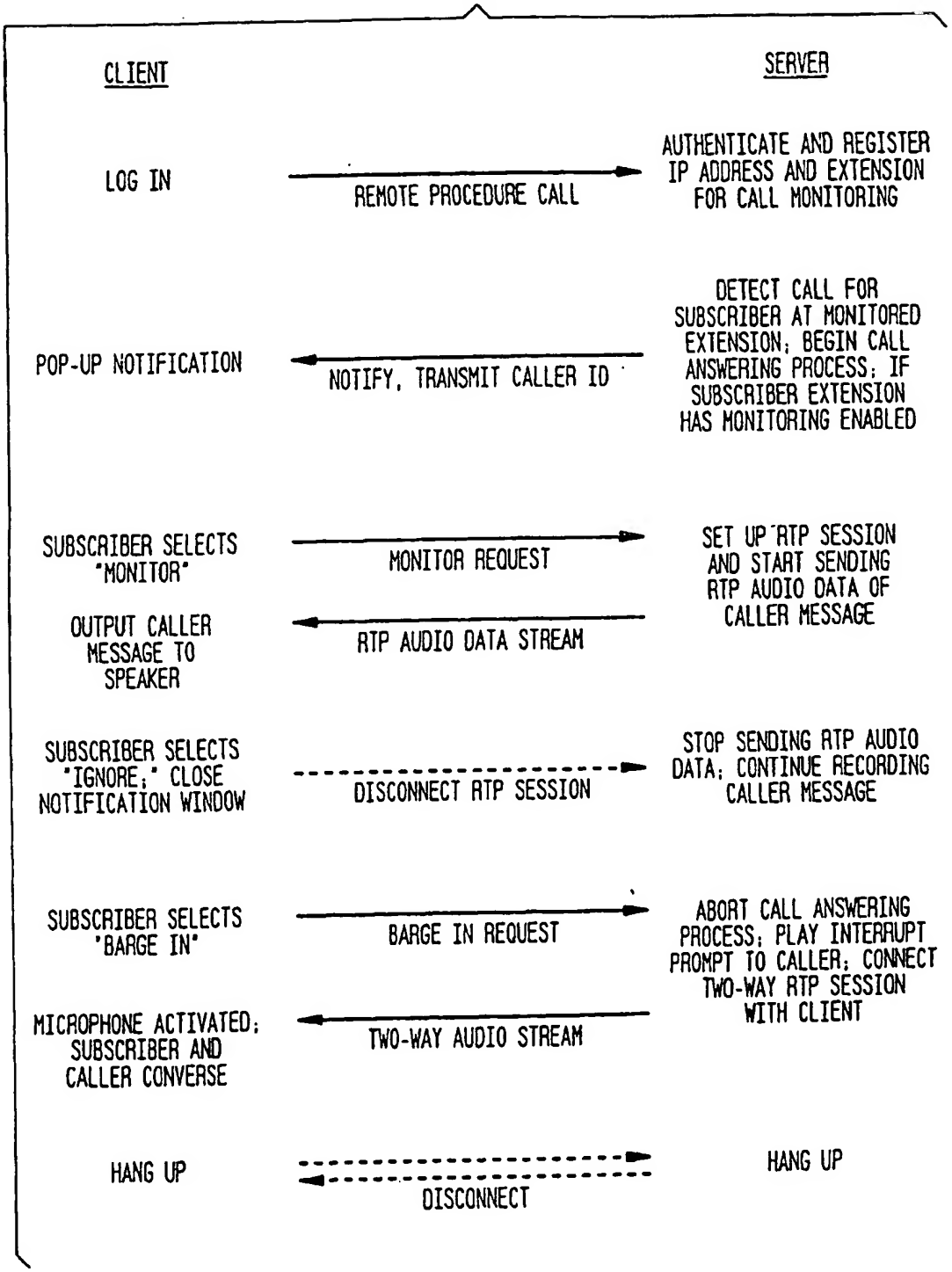

AnyPath Message Monitor
Log In
Call Log
New Call Logging
New Call Monitoring
Exit
Lucent Technologies
Bell Laboratories
AnyPath Message Monitor
Bob Klein (OMD-Denver)
No Calls Received
No New Messages
Any Path
Message Monitor-New Call
Call From (303) 896-2596 - Sherry Qin
Elapsed time: 00:05:19
Any Path
Hang up!
404
402
Monitor Caller
Barge In
Hi
Lo
Volume Control

FIG. 5


CLIENT
SERVER
LOG IN
REMOTE PROCEDURE CALL
AUTHENTICATE AND REGISTER IP ADDRESS AND EXTENSION FOR CALL MONITORING
POP-UP NOTIFICATION
NOTIFY, TRANSMIT CALLER ID
DETECT CALL FOR SUBSCRIBER AT MONITORED EXTENSION; BEGIN CALL ANSWERING PROCESS; IF SUBSCRIBER EXTENSION HAS MONITORING ENABLED
SUBSCRIBER SELECTS "MONITOR"
MONITOR REQUEST
SET UP RTP SESSION AND START SENDING RTP AUDIO DATA OF CALLER MESSAGE
OUTPUT CALLER MESSAGE TO SPEAKER
RTP AUDIO DATA STREAM
SUBSCRIBER SELECTS "IGNORE;" CLOSE NOTIFICATION WINDOW
DISCONNECT RTP SESSION
STOP SENDING RTP AUDIO DATA; CONTINUE RECORDING CALLER MESSAGE
SUBSCRIBER SELECTS "BARGE IN"
BARGE IN REQUEST
ABORT CALL ANSWERING PROCESS; PLAY INTERRUPT PROMPT TO CALLER; CONNECT TWO-WAY RTP SESSION WITH CLIENT
MICROPHONE ACTIVATED; SUBSCRIBER AND CALLER CONVERSE
TWO-WAY AUDIO STREAM
HANG UP
DISCONNECT
HANG UP